

Continuing education through Telemedicine for Ontario

Elizabeth A. Lindsay, PhD
David A. Davis, MD
Fred Fallis, MD
Don B. Willison, MSc
Judith Biggar, RN

Telemedicine for Ontario (TFO) is a continuing education program for health professionals. It is an interactive audio system, organized and operated by the five provincial medical schools, that is designed to offer otherwise unavailable educational programs to health professionals in northern or other isolated areas of Ontario. TFO has provided programs in three categories — medicine, nursing and allied health — and has covered a wide range of topics; the programs have been tailored to the stated needs and interests of the participants. By 1986 there were 199 sites throughout Ontario that participated regularly, and there were approximately 25 000 individual registrations in the 1985-86 seasons. Our results from this 3-year pilot study have indicated the feasibility of the medium and its acceptance by health professionals. The next stage of the program's evaluation will include analyses of its impact on clinical practice and on the health status of patients.

Telemedicine for Ontario s'attache à l'enseignement continu des professionnels de la santé. C'est un réseau d'échanges sonores, conçu et administré par les cinq facultés de médecine de la province, afin de fournir au personnel sanitaire du Nord et des autres endroits isolés de l'Ontario des possibilités de perfectionnement qui, autrement, ne seraient pas à leur portée. Les programmes se divisent en trois catégories destinées aux médecins, aux infirmières et aux auxiliaires sanitaires. Ils touchent à une vaste gamme de sujets selon les désirs exprimés par les participants. En 1985 et 1986 nous avons eu quelque 25 000 inscrits, provenant en 1986 de 199 organismes. L'étude-pilote sur 3 ans démontre

From the Faculty of Health Sciences, McMaster University, Hamilton, Ont., and Telemedicine for Ontario, the Toronto Hospital

Reprint requests to: Dr. Elizabeth A. Lindsay, Continuing Education, Rm. 1M 7A, Health Sciences Centre, McMaster University, Hamilton, Ont. L8N 3Z5

que ce médium est valable et qu'il plaît aux professionnels de la santé. Il nous reste à en analyser l'incidence sur l'exercice clinique et la santé des clients.

Health professionals seek continuing education through various formal and informal activities such as attending rounds, reading articles and discussing matters with peers, pharmaceutical representatives and patients. The effectiveness of different methods of continuing education depends on a complex set of factors, including practice context and the perceived importance of the content.¹ When appropriate and systematic evaluation has been applied, studies of continuing medical education have shown that participants increased their knowledge and often changed their perceptions and practices.² At the simplest level the objective of continuing education is to deliver accurate and relevant knowledge to the learner. Journals or audio tapes can provide this type of basic information; however, interaction and personal involvement can result in greater changes in attitudes and practices.^{2,3} Such interactive or group learning experiences are less common among Ontario physicians outside the medical teaching centres.

In 1981 a report of the Ontario Council for Continuing Medical Education⁴ described deficiencies in the continuing education of Ontario's physicians, one of the most apparent being a dearth of interactive opportunities for physicians in northern and other isolated areas of Ontario. These people appeared to have adequate access to the non-interactive continuing education resources. In 1982 representatives from the continuing medical education division of each of the five Ontario medical schools (under the aegis of the Council of the Ontario Faculties of Medicine) designed a teleconferencing network, Telemedicine for Ontario (TFO), which was funded in part by the Ontario Ministry of Health. TFO was implemented in March 1984 and after 3 years has grown to meet many of the needs of isolated health professionals. We describe how the TFO project operates and

provide the results of the evaluation conducted during the initial phase of the project.

Methods

Organization

The five medical schools divided the responsibilities for the operation of TFO: the University of Toronto handled administration and program organization, McMaster University evaluated the project, the University of Western Ontario explored television programming, Queen's University assessed the learning needs, and the University of Ottawa handled French-language programming. In addition, each university shared in the provision of speakers and the planning of programs.

Technology

Because of cost and ease of access, the TFO project team chose an audio system that involved telephone lines linked to a centrally located switchboard or "bridge", in Toronto. This bridge equalizes voice input, so that relatively distant and local voice input are of equal volume and clarity,

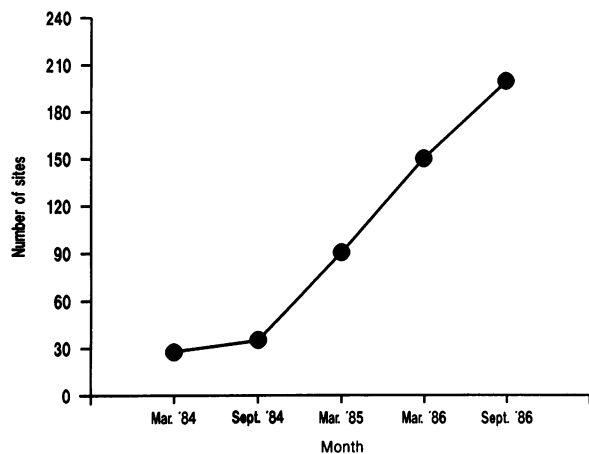


Fig. 1 — Number of sites registered in Telemedicine for Ontario (TFO) programs from March 1984 to September 1986.

and it permits line scanning, so that only one speaker is heard at a time. People register for a program several weeks ahead and dial the bridge number to access it. Preregistration permits the distribution of slides and printed material to enhance the audio portion of the program.

Format

Programs last 45 minutes to 1 hour and are in series designed to reach audiences in three broad categories: medicine, nursing and allied health. Each program follows a similar format: the speaker gives a prepared lecture that is followed by a question-and-answer session with the participants. Assessment of educational requirements was initially done on the basis of input from the planners but now incorporates input from the participants by means of a questionnaire and direct feedback.

In general, program evaluation has followed Dixon's type I classification, which concentrates on participation data and the learner's perception of the program.⁵ This process depends on evaluation forms, which are completed by the participants after the course ends and are returned by the site coordinators to McMaster University for evaluation.

Results

A total of 199 sites registered for the programs in the 1986-87 seasons; this number reflects almost a sevenfold increase since the project's inception (Fig. 1). Northern Ontario (north of Huntsville and Owen Sound and including Ottawa) constituted 63% of the sites. Hospitals accounted for 166 sites (83%), independent laboratories for 23 (12%) and ambulance services for 10 (5%) (Table I). The mean number of sites in each program has increased slightly over the past three seasons, from 12 to 15. Sites outside of large medical centres, particularly in northern Ontario, were most consistently involved.

Since approximately 40% of the sites did not return the evaluation forms, we estimated the attendance by multiplying the total number of sites

Table I — Number of sites that participated in Telemedicine for Ontario programs from September 1984 to June 1986, by category

Season	Category of site			Total	Mean per program
	Medicine	Nursing	Allied health		
September to December 1984	154	129	171	454	4.2
January to June 1985	698	564	914	2176	11.9
September to December 1985	447	449	767	1663	14.2
January to June 1986	799	636	1409	2844	15.4

in the program by the mean number of participants at the sites that completed the forms. We estimated that 16 071 health professionals were involved in TFO programs from January to June 1986, compared with 11 160 from January to June 1985. Participants were counted more than once if they attended more than one program. The mean number of people in each program increased each season: from about 22 participants (14 completed forms) per program in the first season to a high of 87 (47 completed forms) during the second half of 1986. The people who participated in the allied health programs, which accounted for 40% to 50% of the programs, included laboratory technologists, hospital administrators and physiotherapists (Fig. 2). Approximately 20% of all attendees, 30% of whom were physicians, participated in the medical programs. The number of nurses attending the nursing programs, which attracted approximately one-third of all the participants, was fairly consistent.

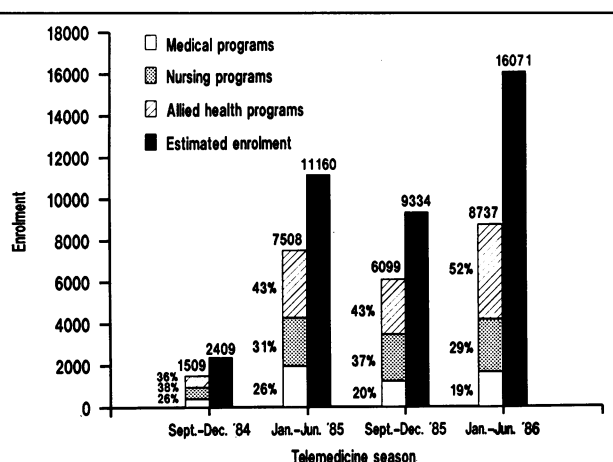


Fig. 2 — Reported and estimated number of enrolments in TFO, by category of audience.

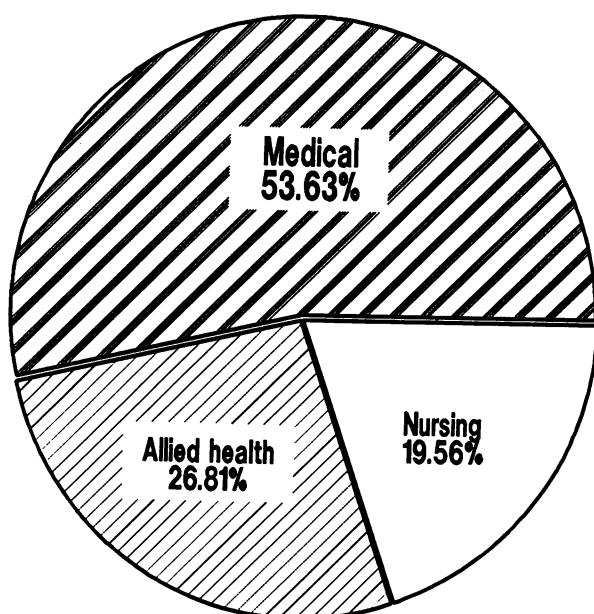


Fig. 3 — Proportion of 593 programs in each category in 1984-86.

Fig. 3 shows the proportion of the 593 programs for each category of audience in 1984-86. The figures changed each season according to the needs of the participants. The proportion of nursing programs remained constant, at just under 20%. Medical programs represented almost 50%. An increasing number of programs in the medical series dealt with issues of general interest to all health professionals; this was reflected in the increased attendance by nonphysicians. The proportion of allied health programs increased slightly in the final 1985-86 season, to 28%.

The comments on the evaluation forms helped to change the organization and content of the programs and were shown to the speakers. The goal of this process was to improve the quality of the programs on the basis of the needs and interests of the participants. Although it is difficult to generalize the comments, we were able to determine that most speakers and topics were acceptable to the participants, who consistently rated speakers between 3.5 and 4.5 on a 5-point scale for relevance, organization and format of their presentations.

Discussion

The growing number of sites and participants in TFO suggests an increasing acceptance of the teleconferencing medium by health professionals in Ontario. The fact that many of the sites (63%) were in northern and isolated areas indicates that TFO is achieving one of its original objectives. Although health professionals appear to accept teleconferencing, they may prefer "live" continuing education courses in the larger centres. The number of participants increased in both the medical and nursing programs (by four and five times respectively in the last season compared with the first); however, the greatest increase (eight times) occurred in the allied health programs. This trend was also indicated by the increasing number of laboratories that were listed as sites.

Participation by profession was also of interest. Although there were substantial increases in the actual numbers, physicians accounted for 26% of the participants in 1984 but only 19% in 1986. This may be explained by the more rapid growth in attendance by allied health professionals, from 36% in 1984 to 52% in 1986; these figures reflect the increased number of programs (e.g., in physiotherapy) that were not directed toward nurses or physicians. The relatively low proportion of physicians who participated reflects the number of physicians compared with the number of other health professionals in the communities. For example, in 1985 in Thunder Bay and Sudbury nurses outnumbered physicians eight to one and seven to one respectively.^{6,7} Similarly, the ratio of nurses to physicians who attended TFO programs over the past three seasons averaged five to one. The relatively low proportion of physicians may have

also resulted from a preference for established, more available continuing education resources. However, the consistent, continuing representation by physicians indicated a commitment to continuing education, which could influence the care provided in smaller, more isolated communities.

Participant satisfaction, when measured by increasing attendance figures and evaluation forms, was good; this finding was supported by other audioconferencing networks.⁸ Sanborn and associates⁹ indicated that most (76%) of the attendees believed that televised lectures posed no obstacle to learning. Meyer¹⁰ found that the amount of knowledge gained from audioconferencing was equal to that gained from a traditional classroom format. Driver and colleagues¹¹ studied a series of audio broadcasts and found no changes in the participants' attitudes or behaviour. As with the evaluation of continuing medical education in general, few studies have measured changes in performance or have assessed patient outcome.

One question that has been addressed in the literature is the relative effectiveness of the various types of teleconferencing, including audioconferencing (with or without extra media) and videoconferencing. In the mid-1970s Conrath and Dunn and their coworkers^{12,13} compared four modes of transmission to determine which was most appropriate for remote consultation: two-way colour video, two-way black-and-white video, two-way audio with slow scan and two-way audio alone. They generally found no differences between the systems in terms of diagnostic accuracy (when compared with direct observation), time to reach a diagnosis, tests required, patient management practices, referral rates and patient satisfaction. Video interventions have, however, been reported to be better for psychiatric consultations than for other consultations, since nuances of gesture and facial expressions are seen.¹⁴

Conclusions

On the basis of these findings it seems that TFO provides at least the most inexpensive continuing education medium for many isolated health professionals. It has apparently established itself in the continuing education practices of health professionals in Ontario, particularly in the north. Furthermore, a consortium of medical schools has been involved in the TFO project, a concept unique to North America. The numbers of sites and health professionals actively participating in this audioconferencing system have steadily increased. The types of health professionals and the trends in their participation have varied, depending on such factors as the number of people in a particular profession at each site, the professional continuing education patterns and practices, the expectations of the professionals or employers (e.g., hospitals), cost and time.

Participant satisfaction has generally been good. This does not, however, assure changes in knowledge, attitude or behaviour, and the formidable task of evaluating changed clinical behaviour or improved health care outcomes requires more rigorous experimental design and considerable expense. We urge that such studies be undertaken, since health care needs, particularly in the north, are unique, visible and significant. Despite the fact that clear behavioural outcomes have yet to be determined, the formative evaluation of TFO appears promising and should lead to more rigorous studies of the outcomes of teleconferencing. If TFO is found to be an effective medium for continuing education, it will have a significant impact on isolated health professionals and the care their patients receive.

We thank Ms. Kristine Simic for her consistently hard work on the data management.

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